REMARKS

Applicant appreciates the Examiner's thorough consideration provided the present application. Claims 1, 7, 9, 11, 12, 15, 16, 23, 24, 27, 29, 36, 37, 44 and 47-51 are now present in the application. Claim 29 has been amended. Claims 1 and 29 are independent. Reconsideration of this application, as amended, is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 7, 9, 11, 12, 23, 24, 27, 29, 36, 37 and 47-49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Malin, U.S. Patent No. 5,377,002, in view of Hamashima (U.S. Patent No. 4,744,663). Claims 15, 16, 50 and 51 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Malin in view of Hamashima, and further in view of Worster (U.S. Patent No. 5,479,252). Claim 44 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Malin in view of Raz (U.S. Patent No. 6,049,421).

Claim 1

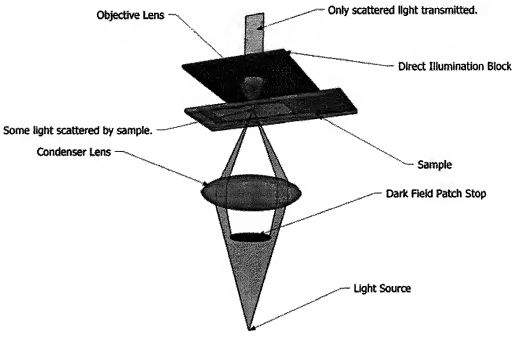
Independent claim 1 recites a combination of elements including "[a]n apparatus for identifying a position of marked objects having unknown positions and detecting a property of the marked objects contained in a specimen, wherein the marked objects are marked with a fluorescent stain, the apparatus comprising a frame, a member positioned on the frame and having a surface that is adapted to receive and hold the specimen, at least a first light source for emitting at least a first light beam towards the specimen held by the member, wherein the first light beam is adapted to provide a light spot having a diameter between 20-150μm on the

specimen, at least a detector for detecting fluorescent light emitted from the marked objects upon interaction with the first light beam, the first light source and the detector being arranged so that a part of a light beam path from the first light source to the specimen is co-axial with a part of the light emitted from the marked objects, at least one beam-splitter being arranged to reflect the first light beam towards the specimen and filter light emitted from the specimen, thereby allowing fluorescent light from the marked objects to pass through the beam-splitter to the detector, scanning means for scanning the entire surface of the member in relation to the detector along a non-linear curve, wherein the scanning means comprises means for rotating the member and means for displacing the member along a radius of the rotation of the member, so as to identify the position of the marked objects in the entire specimen and detect the property of the marked objects, the means for rotating and the means for displacing being directly connected to the member, the member being rotatable and displaceable along a radius of the rotation of the member, scanning control means for controlling the scanning means for scanning the specimen along the non-linear curve, storage means for storing detector signals relating to the marked objects provided by the detector and corresponding position signals provided by the scanning control means, means for retrieving the position signals stored in the storage means, and a microscope for viewing images of the marked objects, wherein the scanning control means use the retrieved position signals to place the microscope at the position of the marked objects to allow performing a detailed examination of the marked objects."

Applicant respectfully submits that the above combination of elements as set forth in independent claim 1 is not disclosed nor suggested by the references relied on by the Examiner.

Malin's system is used for detecting defects and contamination of surfaces – defects and contaminations being detectable using dark field microscopy, since this permits higher resolution and at the same time a greater measuring sensititivity (see col. 2, lines 20-22).

With dark field microscopy the geometrical imperfections in the surface generates a higher contrast than normal (light field) microscopy will deliver. The principle is illustrated by the following figure:



Further illustrations are shown in Malin (see Figures 4a-4c). It is clear from reading col. 5, line 48 to col. 6, line 23 of Malin that the implementation of a dark field stop is an essential part of the system in Malin. It is also clear from reading col. 6, lines 45-56 of Malin that any light having a path perpendicular to the surface of the object does not reach the detector, but is deflected towards the light source.

Before discussing the lack of relevance of Malin, it is important to understand the difference between *detecting scattered light from a surface* and *detecting fluorescent light emitted from a fluorescently marked object being excited with excitation light*.

In particular, scattering light is light is deflected haphazardly as a result of collision with defects and contaminations on a surface. As a result, the angle of scattering light is anything but perpendicular to the surface, which is why the dark field stop in fact works when studying scattering, because the scattering light diverge pass the dark field stop.

On the other hand, a molecule with fluorescent properties will emit light spherically. Although it can be observed from any direction, it is necessary to have a sufficiently large receiving aperture in order to collect as much light from the fluorescently marked objects, when the amount of fluorescent light is limited.

As a consequence, a dark field stop in the light path will stop the light emitted from the fluorescently marked objects to a degree where detection becomes impossible. This is particularly the fact when small objects like biological cells are under investigation.

In the outstanding Office Action, the Examiner alleged that the recitation "*wherein the marked objects are marked with a fluorescent stain*" as set forth in claim 1 was not given any patentable weight since the object marked by a fluorescent stain is not a component of the claimed apparatus and does not appear to impose any additional structural limitations on the claimed apparatus. However, Applicant respectfully disagrees. In particular, the above recitation as set forth in claim 1 does in fact impose an additional structural limitation of the claimed apparatus because the apparatus of Malin cannot be used for detecting fluorescent stain due to

the presence of the dark field stop, which inherently also stops light emitted from a fluorescent stain in the object.

In addition, introducing the dichroic filter from Hamashima as well as any other optical components from Hamashima does not provide the apparatus of Malin with a possibility of detecting any fluorescent emission from the object, since such emission cannot pass the dark field stop being an essential part of Malin. In addition, in the optical system of Hamashima, the receiving aperture for the detection of fluorescence is insufficient as the dark field method requires a significant part of the spherical angle leaving a small aperture open for reception of light from the surface. This is particularly relevant when detecting fluorescent light from marked cells.

Furthermore, Applicant also respectfully submit that, as already discussed previously, that Malin does not teach a light spot diameter between 20-150 μm. Malin may teach something which is larger than 1 μm; however, the claim relates to a light spot being at least 20 times larger, which cannot be read into Malin. Although the Examiner alleged that Malin discloses a light spot of 50 μm, there is no substantiated basis for such a statement.

In view of the above, it is believed that claim 1 clearly defines over Malin in view of Hamashima.

Claim 29

Independent claim 29 recites a combination of steps including "[a] method of identifying a position of a fluorescently marked object having an unknown position and detecting a property of the object contained in a specimen, wherein the object is a biological cell or a microorganism,

the method comprising the steps of: positioning the specimen on a member having a surface that is adapted to receive and hold the specimen, emitting at least a first light beam from a first light source towards the specimen held by the member, wherein the first light beam is adapted to provide a light spot having a diameter between 20-150μm on the specimen, and wherein the first light beam is reflected by a beam-splitter towards the specimen, scanning the entire surface of the member in relation to a detector along a non-linear curve by rotating the member holding the specimen and displacing the member along a radius of the rotation of the member, the member being rotatable and displaceable along a radius of the rotation of the member, arranging the light source and the detector, so that a part of a light beam path from the first light source to the specimen is co-axial with a part of a light emitted from the object, filtering through said beam-splitter light emitted from the specimen, passing fluorescent light from the marked objects through the beam-splitter towards the detector, detecting the fluorescent light emitted from the object, thereby identifying the position of the object and detecting the property of the object during scanning of the entire specimen, storing detector signals relating to the object provided by the detector and corresponding position signals provided by the scanning control means, retrieving the position signals stored in the storage means, placing a microscope at the position of the object using the retrieved the position signals to allow performing a detailed examination of the object, and optically inspecting the object by viewing an image of the object via the microscope by a user."

Support for the amendments to claim 29 can found at page 5, lines 34-35 of the specification as originally filed. Applicant respectfully submits that the above combination of steps as set forth in

amended independent claim 29 is not disclosed nor suggested by the references relied on by the Examiner.

In particular, claim 29 has been amended to recite that the marked objects are biological cells and microorganisms. Neither Malin nor Hamashima relates to detection of biological cells and microorganisms. Instead, Malin and Hamashima simply relate to detection of defects or contaminations or patterns in surfaces. In particular Hamashima detects only a pattern formed in a semiconductor wafer by, for example, detection of luminescence. The dimension of a pattern in a semiconductor wafer is much larger than a biological cell or a microorganism. Therefore, the amount of luminescent light to be emitted from the pattern is much more that the fluorescent light emitted from a single biological cell or microorganism.

As described above, the system of Malin cannot be used for detection of fluorescence at all. The system of Hamashima cannot be used for detection of fluorescence from cells or microorganisms because of the necessary dimension and position of object lens 26. In order to allow any scattering light to "get around" object lens 26, the object lens 26 cannot be too large or too close to the surface, meaning that the amount of light collected by object lens 26 may allow for detection of a pattern printed in a wafer but certainly not allow for detection of biological cells or microorganisms. On the other hand, if the object lens were to have a dimension or position in relation to the surface allowing collection light emitted from biological cells and microorganisms, then the scattering part of the system of Hamashima cannot work.

As seen from Figure 1 of the present application, the magnification lens 11 is positioned immediately above the surface to be examined in order to collect the necessary light when detecting biological cells and microorganisms.

Accordingly, the utilized references do not relate to detection of biological cells and microorganisms, and cannot be used for detection of fluorescently marked biological cells and microorganisms. Therefore, amended independent claim 29 clearly defines over Malin in view of Hamashima.

With regard to the Examiner's reliance on Worster and Raz, these references have only been relied on for their teachings related to some dependent claims. These references also fail to disclose the above combinations of elements and steps as set forth in independent claims 1 and 29. Accordingly, these references fail to cure the deficiencies of Malin and Hamashima.

Accordingly, none of the references utilized by the Examiner individually or in combination teach or suggest the limitations of independent claims 1 and 29 or their dependent claims. Therefore, Applicant respectfully submits that claims 1 and 29 and their dependent claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

CONCLUSION

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

In the event there are any matters remaining in this application, the Examiner is invited to contact Cheng-Kang (Greg) Hsu, Registration No. 61,007 at (703) 205-8000 in the Washington, D.C. area to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By _____ #61,267

Paul C. Lewis
Registration No.: 43,368
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road
Suite 100 East
P.O. Box 747
Falls Church, Virginia 22040-0747
(703) 205-8000
Attorney for Applicant